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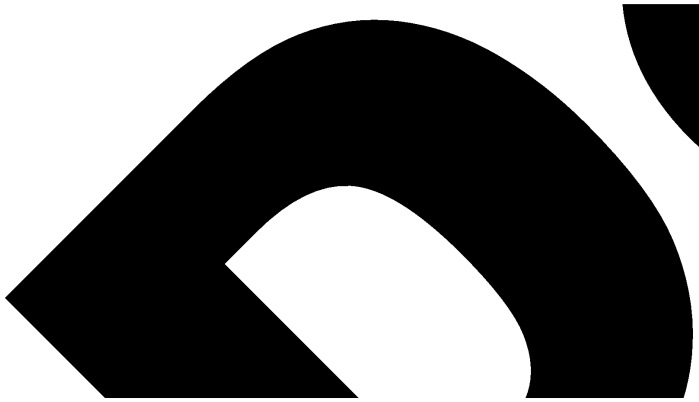

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Intelligence Memorandum

USSR: The Effect of Construction Problems on Technological Progress

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
September 1969

INTELLIGENCE MEMORANDUM

USSR: The Effect of Construction Problems on Technological Progress

Introduction

In a widely noted July *Pravda* article, Vadim A. Trapeznikov, the first deputy chairman of the USSR State Committee on Science and Technology, identified construction delay as a major factor retarding technological progress. Trapeznikov's essay on a "time is money" theme adds to the recent flurry of interest in the construction sector. This summer Moscow issued three decrees directed at basic problems of the construction industry. The decrees authorize bonuses for the timely completion of projects and for high-quality work and also establish new planning methods to insure greater control over the construction process and to improve design and estimating work.

The purposes of this memorandum are to (1) appraise the likely result of Trapeznikov's suggestions for reducing average construction time and (2) examine the importance of the link between construction time and technological progress.

Note: This memorandum was produced solely by CIA. It was prepared by the Office of Economic Research.

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Trapeznikov's Reasoning

1. Trapeznikov believes, as do others in the USSR and in the West, that accelerating rates of technological progress the world over make the speed with which new technology is introduced more critical. He says that the USSR takes longer to build plants and install equipment than do other countries. As a result, the technology when it reaches the mass production stage is often already obsolete and the average level of technology in the economy (and the volume of production) is lower than it would be with faster construction. In addition, construction schedules tie up labor, materials, and construction machinery that could be used profitably elsewhere.

2. Trapeznikov asserts that the reasons for inefficient construction in the Soviet Union are "well known." Plans, specifications, and directives are held up too long in the planning bureaucracy. Construction jobs are not given adequate funds, materials, equipment, or men. Trapeznikov's solution is to pare authorized construction projects to half their present number. This, he says, would reduce the average length of construction period by 50 percent or more. The resources could then be redistributed with the help of a continuous computer inventory of construction projects and resources.

Extent of Construction Delays

3. Construction does take longer in the USSR. Knowledgeable Soviets admit this, and professionally competent Westerners have said the same. How much longer cannot be estimated reliably. Viktor Krasovskiy, a prominent economist attached to the Academy of Sciences who has studied investment problems since the 1930's, said in 1967 that "according to available estimates" the design stage lasts two to three years in the USSR (compared with his estimate of less than a year in the United States). After the design is completed, the average construction period for all projects is about 2½ years, and the construction of large enterprises and complexes can take from seven to 12 years. Anticipating Trapeznikov, Krasovskiy argued that foreign experience

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and the experience of leading Soviet construction organizations had "proved" that it would be possible to reduce construction periods from the national average of 2 to 2½ years (and from 7-12 years to 3-3½ years for larger projects).

4. The precise difference in average construction time between the USSR and the United States simply cannot be determined because no one has the information to do so.

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The Mogilev terylene plant is a year behind schedule, and the Tol'yatti Fiat works has fallen six to 12 months behind schedule. Delays are even worse in the metals industry. The 2,500-mm cold rolled strip mill at Magnitogorsk, the largest in the Soviet Union, was supposed to have started producing in 1963-64, but the breaking-in period only began last May. The Achinsk alumina plant has been under construction for more than a decade and after repeated delays is now scheduled for completion in 1969. The plant is to employ new technology for the processing of nepheline ores, a substitute material for bauxite, the raw material normally used in world practice. The list could run on and on. Nevertheless, as Krasovskiy pointed out, some Soviet construction organizations when given the necessary support have measured up to the best world standards. The more recent examples in the civil field include the Bratsk hydroelectric complex, the Aswan Dam, and the Moscow, Leningrad, and Kiev subway extensions.

5. In the absence of hard direct evidence on the difference between construction times in the United States and the USSR, a comparison of the ratio of unfinished construction to the value of investment can provide an indirect measure. According to Krasovskiy, the ratio of unfinished construction to investment in America in 1958 was far less than roughly comparable ratios in the USSR in recent years. To some degree, these comparisons are biased against the USSR because unfinished construction tends to be larger relative to new annual fixed investment the faster the rate of growth of investment and the greater the share of "green field" construction in

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total investment. Nevertheless, the differences in the ratios are quite large (see the table) -- in almost every case the ratio for the USSR is about twice that for the United States. Thus the fact of significant differences in average industrial construction time between the two countries seems well established.

6. An examination of the behavior of the ratio of unfinished construction to investment over time, however, casts doubt on Trapeznikov's statement that

Ratio of Unfinished Construction to Investment

	United States 1958	USSR 1966-67 a/
All industry	0.50	0.88
Electric power and gas plants	0.42	1.01 b/
Metallurgy	0.79	0.98 c/
General machine building	0.34	0.83
Construction materials	0.52	1.11
Chemicals	0.70	1.42
Petroleum and coal processing	0.47	1.01 d/
Food processing	0.34	0.60
Textiles	0.24	0.66 e/

a. Calculated from data in Soviet statistical handbooks.
b. Electric and thermal power.
c. Ferrous only.
d. Coal, oil, and gas.
e. All light industry.

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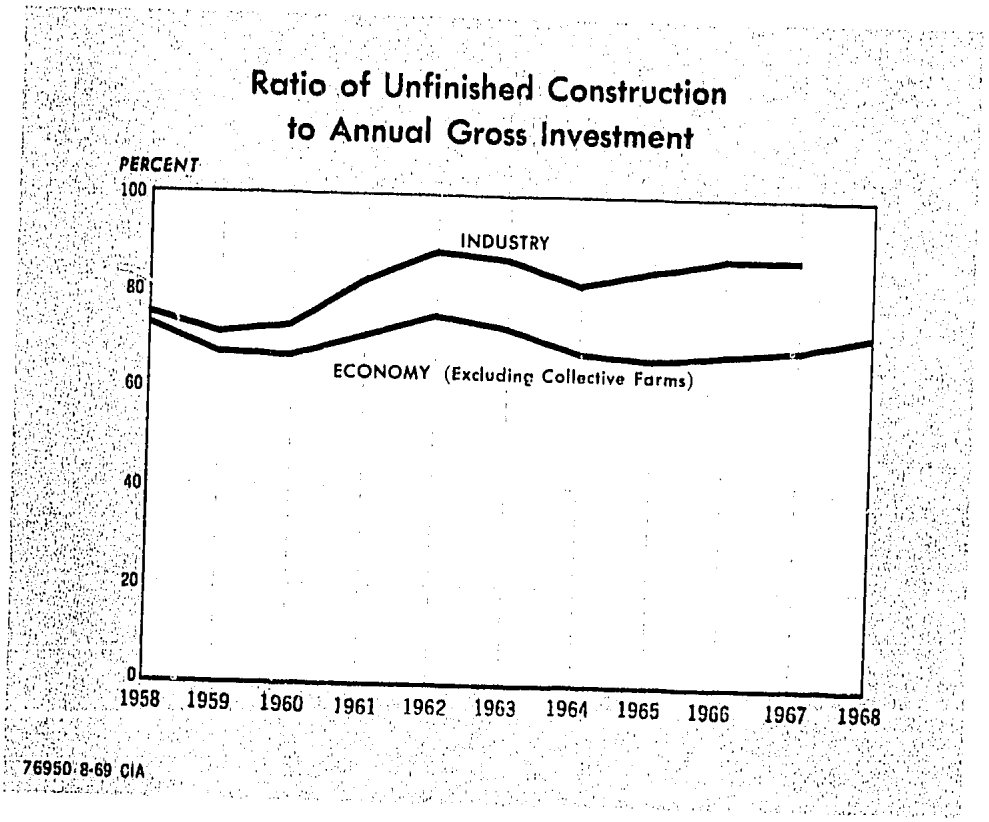
the construction problem is getting worse. Unfinished construction stood in much the same relation to investment in the economy (excluding collective farms) in 1968 as it had in most of the preceding decade (see the chart). Similarly, the ratios for industry in 1965-67, the most recent years for which the ratio can be calculated, were virtually identical with those in 1961-63. Even if construction delays became much more pronounced in the first half of 1969, Trapeznikov is talking about a longstanding, not a new, problem.



7. The influence of construction delays on technological progress does not seem very large, if, as Krasovskiy estimates, the goal is to reduce average construction periods by one-half year. In the USSR, however, as in other countries a great deal of investment simply replaces or supplements old production facilities with new facilities not very different with respect to the technology embodied in them.

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Undoubtedly there are some areas of new investment that tend to advance technology more than others. Trapeznikov insists that a planned economy should have an advantage in speeding up construction on this kind of "key" project, as he claims the USSR has been able to do in the fields of atomic energy and space.

8. The difficulty with the key projects has been that they are important precisely because they change the pattern of development. As a result they require new kinds of equipment that frequently have to be imported or whose development is also a "key" project. According to Krasovskiy, in the 1960's "the construction cycle ranging from earth-digging operations to the construction [of buildings] was accomplished far more successfully and rapidly than the subsequent installation-technological part which depended on the supply of the necessary equipment."

9. If the USSR could manage to rank investment projects by prospective return and then build them more efficiently, technological progress in the USSR would be faster but by not nearly as much as Trapeznikov implies. The technological gap between the USSR and the United States, for example, exists because in the USSR the process of incorporating known world technology into actual construction designs is so slow, cumbersome, and uncertain. While domestic critics rail at the time it takes to complete new productive capacity, the more important economic losses arise from the building of capacity known to be outdated.

10. The example of oxygen-steelmaking can be cited. Despite its clear advantage, only 9 percent of the total increase in steel production in the USSR between 1956 and 1964 came from the oxygen blown process, compared with 35 percent in France, 48 percent in West Germany, 54 percent in the United Kingdom, 61 percent in Japan. In the United States, in fact, there was a 128 percent increase (as the output of other processes declined). Leading Soviet experts deprecated the seven-year plan's intention to get 79 percent of new steelmaking capacity from obsolete open-hearth furnaces. The controversy escalated to higher and higher levels until by 1961 Khrushchev himself had entered the debate.

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11. Thus the diffusion of new technology in the USSR is slowed by a number of factors quite apart from construction delays. The price system is not very helpful in ranking investment projects because it reflects relative costs imperfectly. New production methods and products have to be introduced by administrative direction and incorporated in long-range plans that run counter to the interests of enterprises whose quotas and bonuses are threatened by the interruptions to production caused by changes in techniques. Evidently Trapeznikov had this bureaucratic structure in mind when he complained:

> Lengthy examinations, agreement, and confirmation of drafts delay the realization of technological ideas; prolonged periods of agreement on planning and management processes, periods occasionally lasting many months, slow down decision making.

Potential Effect of Adapting Trapeznikov's Program

12. Practically all of the remedies that Trapeznikov suggests for the construction problem have been tried before. For example, the 1960 Budget Speech announced that a special list of priority construction projects had been created. Another decision declared that no territorial organs were to submit an investment project for approval without authorization by a specified Communist Party committee. Still the ratio of unfinished construction to investment increased in 1961 and 1962. In 1962, 476 projects were supposed to be given special attention, the procedure for approving construction plans was centralized, and no project worth more than 2½ million rubles was to be included in the construction plan without Gosplan's approval. In both the economy as a whole and in industry, the ratio of unfinished construction to investment fell very slightly in 1963.

13. The five-year-plan directives (1966-70) stressed the modernization and extension of existing capacity so as to get a quicker return on investment. Construction was to be carried out only when it could be shown that a project: (1) had complete documentation, (2) was fully provided with financial

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and material resources, and (3) could be completed within the time specified by the plan. The number of new starts on large construction projects was to be cut from 463 in 1965 to 327 in 1966. According to the official commentary on the plan this would "permit us to significantly reduce the share of unfinished construction in which now is found about 70 percent of the annual volume of capital investment and to free significant material and financial resources." But in 1966 the ratio of unfinished construction to total investment began a slow but steady rise -- from 66 percent in 1965 to an estimated 73 percent in 1968. Just last December Nikolay Baybakov, in his speech revealing the 1969 plan, announced that the government was submitting a list of 300 new construction projects of a productive nature, about half the number in the 1968 plan. Those projects which were most important for "overcoming bottlenecks" in the economy were marked for preferential treatment.

14. Clearly, the antecedents of the current proposals to whittle down investment programs to fit the available resources are numerous. Why, then, have earlier actions had so little tangible effect? The answer seems to be that administrative orders to concentrate construction resources do not work in the present planning environment. As M.M. Golanskiy, a deputy chief of the Central Mathematical Economics Institute, remarked recently to American Embassy officials in Moscow:

> Academician Trapeznikov is certainly correct that we would be better off if we concentrated on fewer projects, but in practice this is almost impossible to achieve. The planning system encourages construction trusts to start as many projects as possible and there is a dynamic in our approach to development which also encourages more and more projects.

15. Under a system in which investment resources are still largely allocated by the state, every ministry, enterprise, republic, and oblast is indeed encouraged to ask for as much as it thinks it can get. What is worse, each unit tends to minimize the cost of the construction projects it wants. The effects of this practice spread in all directions as

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actual construction costs exceed planned costs. Based on the understated estimate costs, projects are allocated too little money and too few men, and the planned production of building materials falls short of actual requirements.

16. The "dynamic" Golanskiy refers to has its origin in the overriding concern with growth in the USSR. Historically, investment has been the source of the high Soviet growth rates. Thus, the ministries are driven to press as many projects as possible on planning agencies which lack the authority and the ability to ration investment resources efficiently. At the same time, localities have been starved of the housing, roads, and municipal services they require. In these circumstances, the pressure on investment resources is almost impossible to satisfy.

17. Beyond the pressures generated by the overall environment, the practical difficulties confronting Trapeznikov's proposal to halve the number of ongoing construction projects are enormous. Postponing certain projects means postponing production that is already counted upon in the national economic plan. Priority lists, moreover, rarely mesh with the actual geographic distribution of construction brigades and building materials. In these circumstances, the computer-assisted inventory of building projects advocated by Trapeznikov would help to make the choices of the planners more practicable; they would not be any less difficult politically.

18. The scattering of construction resources among too many projects, however, is only part of the problem the USSR faces in trying to reduce construction delays. Except for very high priority projects -- such as military, nuclear energy, and space construction and showcase projects like dams and subways -- construction organizations have to deal with haphazard deliveries of materials and equipment. Often working under rigorous conditions, the typical organization has a high rate of labor turnover. The supervisor on the spot has very little control over the hiring of personnel and even less over firing them. Therefore, he has to accept and keep what comes to him -- an inexperienced, casual labor force. On the other hand,

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for the managers, there is little or no penalty for failing to finish a project on time. All of these conditions combine to create a work situation in which apathy and frustration defeat construction schedules. Until the incentive structure is revised, the effect on average construction times of cutting back on the volume of construction will be uncertain.

Other Possible Motives for Trapeznikov's Proposal

19. Perhaps Trapeznikov's proposal was prompted less by a conviction that technological progress depended heavily on average construction times than by a belief that too much emphasis has been placed on the sheer volume of investment. In line with his position on the State Committee on Science and Technology, he has in the past called for a doubling of investment in research and development, even at the expense of capital investment. Using a dubious estimating procedure, Trapeznikov has claimed that investment in science is 3½ times as profitable as capital investment in new production facilities.

20. Alternatively, Trapeznikov could have been trying to distribute the responsibility for the much-discussed "technological gap" beyond the province of the State Committee on Science and Technology. A Polish scientist said in June that Trapeznikov was "in deep political trouble," particularly with V.A. Kirillin, the Chairman of the State Committee, because his previous work had not led to any practical proposals.

Conclusions

21. Trapeznikov's suggestions for alleviating the USSR's construction difficulties and thereby accelerating technological progress will probably have little effect. The administrative measures proposed to gain stronger control over construction have been tried repeatedly, but average construction times have not changed much. Perhaps the extension of the principles of the economic reform to the construction sector will help somewhat, although the experience of industry under the reform is not reassuring.

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22. What is needed to reduce construction delays is a shrinkage of the overall demand for investment funds and a reform of incentives within the construction sector. Until this happens, it will be very difficult either to provide enough investment resources to go around or to use them efficiently. The USSR has lived with these construction problems for years. They can be overcome only by rewarding construction teams adequately for getting quality work done on time and by firing, demoting, or transferring those who fail to do so.

23. Because of the construction delays, technological progress in the USSR is held up. Nevertheless, a sudden improvement in average construction times would not raise the rate of technological progress dramatically. Diffusion of new innovations lags in the Soviet Union primarily because of the reluctance to take a chance on new products and new techniques and because of the time-consuming and unreliable procedures necessary to include an innovation in the investment program.

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